# UNITED STATES PATENT AND TRADEMARK OFFICE

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/643,758 | 08/18/2003 | Kitrick Sheets | 1376.729US1 | 3924 |

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| EXAMINER |
|---|
| TSAI, SHENG JEN |

| ART UNIT | PAPER NUMBER |
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| 2186 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| | Application No. | Applicant(s) |
| Office Action Summary | 10/643,758 | SHEETS ET AL. |
| | Examiner | Art Unit | |
| | SHENG-JEN TSAI | 2186 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1) ☒ Responsive to communication(s) filed on _16 September 2008_.
2a) ☐ This action is **FINAL**.      2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

4) ☒ Claim(s) _1-22_ is/are pending in the application.
   4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☒ Claim(s) _1-10 and 12-21_ is/are allowed.
6) ☒ Claim(s) _11 and 22_ is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

## Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on _18 August 2003_ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a) ☐ All   b) ☐ Some *   c) ☐ None of:
       1. ☐ Certified copies of the priority documents have been received.
       2. ☐ Certified copies of the priority documents have been received in Application No. _____.
       3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
   Paper No(s)/Mail Date _9/16/2008_.
4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

**1.**     This Office Action is taken in response to Applicants' Request for Continued

Examination (RCE) filed on September 16, 2008 regarding application 10/643,758 filed

on August 18, 2003.

**2.**     Claims 1-22 are pending for consideration.

### *Claim Rejections - 35 USC § 102*

**3.**     The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**4.**     Claims 11 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by

Vishin et al. (US 5,860,146, hereinafter referred to as Vishin).

As to claim 11, Vishin discloses **a multi-node system** [as shown in figure 1,

where each "cluster" represents a node] **for implementing remote address**

**translation** [Aluxiliary Translation Lookaside Buffer for Assisting in Accessing Data in

Remote Address Spaces (title); abstract], **the system comprising**:

**a network** [the network, figure 1, 114];

 **a source node coupled to the network** [the corresponding source node may be, for

example, the cluster shown in figure 1, 102], **wherein the source node includes a**

**first remote-translation table (RTT)** [the RTLB (Remote Translation Lookaside

Buffer), figure 1, 160; The computer system further includes a remote translation

lookaside buffer (RTLB) that stores a plurality of remote page table entries. Each

remote page table entry represents a mapping between a range of physical addresses

and a corresponding range of remote physical addresses. The primary translation

lookaside buffer translates a virtual address asserted by the data processor into a

physical address. When the physical address does not correspond to a location in the

local memory, the RTLB determines whether the physical address matches at least

one of the remote page table entries stored in the RTLB, and selects one of those

remote page table entries when at least one match is found. The RTLB's selection

circuitry selects a single remote page table entry in accordance with predefined RPTE

selection criteria when two or more of the remote page table entries match the physical

address. Then, a remote physical address is generated by combining a portion of the

selected remote page table entry with a portion of the physical address (abstract); as

shown in figures 4-8 and the associated text]; **and**

**a remote node coupled to the network** [for example, the other clusters shown in

figure 1, 102], **wherein the remote node includes a second RTT** [each cluster has its

own RTLB (abstract)];

**wherein on the remote node the second RTT is built using a first local address**

**space on the source node** [the RTLB (Remote Translation Lookaside Buffer), figure

1, 160; The computer system further includes a remote translation lookaside buffer

(RTLB) that stores a plurality of remote page table entries. Each remote page table

entry represents a mapping between a range of physical addresses and a

corresponding range of remote physical addresses. The primary translation lookaside

buffer translates a virtual address asserted by the data processor into a physical

address. When the physical address does not correspond to a location in the local memory, the RTLB determines whether the physical address matches at least one of the remote page table entries stored in the RTLB, and selects one of those remote page table entries when at least one match is found. The RTLB's selection circuitry selects a single remote page table entry in accordance with predefined RPTE selection criteria when two or more of the remote page table entries match the physical address. Then, a remote physical address is generated by combining a portion of the selected remote page table entry with a portion of the physical address (abstract); as shown in figures 4-8 and the associated text] **exported from the source node to the remote node using an operating system call to perform the export** [Referring to FIGS. 8 and 9, when working with large files or databases, <u>certain operating system calls (e.g., shmget() and mmap() in UNIX) can be used to set up the file in shared memory</u>. However, such calls bring all of the file into memory, and thus even portions which are not needed are present in memory. This implies that "less memory" is available for other processes which are working on other objects and files … (col. 7, line 54 to col. 8, line 48)];

**wherein on the source node the first RTT is built using a second local address space on the remote node** [the RTLB (Remote Translation Lookaside Buffer), figure 1, 160; The computer system further includes a remote translation lookaside buffer (RTLB) that stores a plurality of remote page table entries. Each remote page table entry represents a mapping between a range of physical addresses and a corresponding range of remote physical addresses. The primary translation lookaside buffer translates

a virtual address asserted by the data processor into a physical address. When the

physical address does not correspond to a location in the local memory, the RTLB

determines whether the physical address matches at least one of the remote page table

entries stored in the RTLB, and selects one of those remote page table entries when at

least one match is found. The RTLB's selection circuitry selects a single remote page

table entry in accordance with predefined RPTE selection criteria when two or more of

the remote page table entries match the physical address. Then, a remote physical

address is generated by combining a portion of the selected remote page table entry

with a portion of the physical address (abstract); as shown in figures 4-8 and the

associated text] **exported from the remote node to the source node using the**

**operating system call to perform the export** [Referring to FIGS. 8 and 9, when

working with large files or databases, <u>certain operating system calls (e.g., shmget() and</u>

<u>mmap() in UNIX) can be used to set up the file in shared memory</u>. However, such calls

bring all of the file into memory, and thus even portions which are not needed are

present in memory. This implies that "less memory" is available for other processes

which are working on other objects and files … (col. 7, line 54 to col. 8, line 48)];

**wherein the operating system enables remote translation utilizing the first and**

**second RTTs, wherein enabling remote translation utilizing the first and second**

**RTTs includes having the remote node translates translate a virtual memory**

**address associated with the source node to a physical address on the source**

**node as a function of the second RTT and having the source node translate a**

**virtual memory address associated with the remote node to a physical address**

**on the remote node as a function of the first RTT** [the RTLB (Remote Translation

Lookaside Buffer), figure 1, 160; The computer system further includes a remote

translation lookaside buffer (RTLB) that stores a plurality of remote page table entries.

Each remote page table entry represents a mapping between a range of physical

addresses and a corresponding range of remote physical addresses.  The primary

translation lookaside buffer translates a virtual address asserted by the data processor

into a physical address.  When the physical address does not correspond to a location

in the local memory, the RTLB determines whether the physical address matches at

least one of the remote page table entries stored in the RTLB, and selects one of those

remote page table entries when at least one match is found.  The RTLB's selection

circuitry selects a single remote page table entry in accordance with predefined RPTE

selection criteria when two or more of the remote page table entries match the physical

address.  Then, a remote physical address is generated by combining a portion of the

selected remote page table entry with a portion of the physical address (abstract); as

shown in figures 4-8 and the associated text]; **and**

**wherein both the first and second RTTs include one or more virtual address and**

**each virtual address includes a node number of a remote node that built the**

**virtual address** [as shown in figures 4-8 and the associated text; Node-ID, figure 7,

170; remote physical page address, figure 7, 172].

As to claim 22, Vishin teaches **the system of claim 11, wherein, when remote**

**translation is enabled, the operating system on each node of the plurality of**

**nodes handles requests to changes the application virtual address space**

**configuration on a node-local basis, wherein handling requests includes**

**disallowing an attempt to modify the application virtual address space outside**

**scope of the local node** [As shown in figure 8, where the operating system (180) is

confined to the local node, and the local RTLB (160); col. 7, line 54 to col. 8, line 48].

### *Allowable Subject Matter*

5.      Claims 1-10 and 12-21 are allowed.

### *Conclusion*

6.      Claims 11 and 22 are rejected as explained above.

Claims 1-10 and 12-21 are allowed.

7.      Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Sheng-Jen Tsai whose telephone number is 571-272-

4244.  The examiner can normally be reached on 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Matthew Kim can be reached on 571-272-4182. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system.  Status information for published

applications may be obtained from either Private PAIR or Public PAIR.  Status

information for unpublished applications is available through Private PAIR only.  For

more information about the PAIR system, see http://pair-direct.uspto.gov. Should you

have questions on access to the Private PAIR system, contact the Electronic Business

Center (EBC) at 866-217-9197 (toll-free).

/Sheng-Jen Tsai/

TFSA Examiner, Art Unit 2186

October 6, 2008